

*Montana*  
*Comprehensive Assessment*  
*System (MontCAS, Phase 2)*  
*Criterion-Referenced Test (CRT)*

COMMON ITEM RELEASE  
GRADE 10



OFFICE OF PUBLIC INSTRUCTION

## General Directions

This test contains six sessions: three in reading and three in mathematics. The sessions are made up of multiple-choice questions and questions for which you must show your work or write out your answers. Write your answers to all of the questions in your Student Response Booklet. For the reading parts of the test, read each selection before answering the questions.

For each multiple-choice question, choose the best answer. Fill in the bubble in your Student Response Booklet that corresponds to your answer choice for that question.

Some questions ask you to show your work or to write out your answers. Write your answers to these questions in the spaces provided in your Student Response Booklet. Your answers must fit in the spaces provided. Any part of an answer outside the box might not be scored.

Be sure to answer all parts of each question, and to answer completely. For example, if a question asks you to explain your reasoning or show your work, be sure to do so. You can receive points for a partially correct answer, so try to answer every question.

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# Reading Session 1

**This test session includes reading selections, multiple-choice questions, and a question for which you must write out your answer. After you read each selection, answer the questions about it in the spaces provided in your Student Response Booklet. You may not use a dictionary or any other reference tool during this session.**

*This is a story about a man who is caught stealing a pear. Read the story and answer the questions that follow.*

## The Pear Seed

(China)

Once, in China, there lived a poor man. One day, he was so hungry that his stomach overruled his conscience and he stole a pear in the marketplace. The vendor had him arrested. When the thief was brought to the Emperor for punishment, he said, "If you will pardon me, I will give you a precious gift."

The Emperor looked at the thief's ragged clothes and responded, "What could you possibly have that I would consider precious?"

The thief pulled a small brown pear seed from his pocket. "When this pear seed is planted, it will sprout overnight. It will bear a fruit of gold."

"Plant it," replied the Emperor. "Tomorrow, when I see the golden pear, I will pardon you."

The thief was allowed to go to the garden and dig a hole while all the court watched. "Plant the seed," the Emperor commanded.

"I cannot; I am a thief. This magic seed can only be planted by a person who has never stolen, cheated

or spoken an untruth. Your Majesty, you may have the honor of planting the seed."

The Emperor blushed, stammered, and blustered, "I am the Emperor; I do not plant crops. Give the seed to the Prime Minister."

The Prime Minister refused, "I am very bad at growing things. I could not grow even a magic seed. Give the seed to the Royal Treasurer."

The Royal Treasurer also gave an excuse. One by one, all the officials in the court declined to plant the pear seed. Everyone stood before the empty hole in silence. Finally, the thief spoke, "Not one of you can plant the seed because not one of you is without a lie, a theft, a misdeed. Yet I am to be punished for stealing one piece of fruit when I was hungry. Is that justice?"

The Emperor replied, "Justice demands that you be released." And so it was.



**Mark your answers to questions 1 through 5 in the section marked "Reading—Session 1" in your Student Response Booklet.**

1. The emperor promised that he would let the thief go free
  - A. if the officials refused to plant a seed.
  - B. when an honest person came forward.
  - C. after a pear seed sprouted overnight.
  - D. when a golden pear was produced.
2. Which sentence from the story expresses an opinion?
  - A. "The vendor had him arrested."
  - B. "I cannot; I am a thief."
  - C. "I am very bad at growing things."
  - D. "The Royal Treasurer also gave an excuse."
3. The author organized the ideas in this story by
  - A. explaining the differences between the thief and the royal court.
  - B. presenting the events in the order in which they happened.
  - C. comparing an honest person with a thief.
  - D. telling the most important events first.
4. What is the **main** purpose of this story?
  - A. to portray class levels in ancient China
  - B. to teach a lesson about life
  - C. to show the effect of poverty
  - D. to describe the court system in ancient China
5. This story is an example of
  - A. biography.
  - B. nonfiction.
  - C. a formal essay.
  - D. a folktale.



*This is an article about how laughter affects health. Read the article and answer the questions that follow.*

## Laughter and Health

We've long known that the ability to laugh is helpful to those coping with major illness and the stress of life's problems. But researchers are now saying laughter can do a lot more—it can basically bring balance to all the components of the immune system, which helps us fight off diseases.

As we mentioned earlier, laughter reduces levels of certain stress hormones. In doing this, laughter provides a safety valve that shuts off the flow of stress hormones and the fight-or-flight compounds that swing into action in our bodies when we experience stress, anger or hostility. These stress hormones suppress the immune system, increase the number of **blood platelets** (which can cause obstructions in arteries) and raise blood pressure. When we're laughing, natural killer cells that destroy tumors and viruses increase, as do **Gamma-interferon** (a disease-fighting protein), **T-cells**, which are a major part of the immune response, and **B-cells**, which make disease-destroying antibodies.

Laughter may lead to hiccupping and coughing, which clears the respiratory tract by dislodging mucous plugs. Laughter also increases the concentration of **salivary immunoglobulin A**, which defends against infectious organisms entering through the respiratory tract.

What may surprise you even more is the fact that researchers estimate that laughing 100 times is equal to 10 minutes on the rowing machine or 15 minutes on an exercise bike. Laughing can be a total body workout! Blood pressure is lowered, and there is an

increase in vascular blood flow and in oxygenation of the blood, which further assists healing. Laughter also gives your **diaphragm** and **abdominal, respiratory, facial, leg and back muscles** a workout. That's why you often feel exhausted after a long bout of laughter—you've just had an aerobic workout!

The psychological benefits of humor are quite amazing, according to doctors and nurses who are members of the American Association for Therapeutic Humor. People often store negative emotions, such as anger, sadness and fear, rather than expressing them. Laughter provides a way for these emotions to be harmlessly released. Laughter is cathartic. That's why some people who are upset or stressed out go to a funny movie or a comedy club, so they can laugh the negative emotions away. (These negative emotions, when held inside, can cause biochemical changes that can affect our bodies.)

Increasingly, mental health professionals are suggesting "laughter therapy," which teaches people how to laugh—openly—at things that aren't usually funny and to cope in difficult situations by using humor. Following the lead of real-life funny-doc Patch Adams (portrayed by Robin Williams in a movie by the same name), doctors and psychiatrists are becoming more aware of the therapeutic benefits of laughter and humor. This is due, in part, to the growing body of humor and laughter scholarship (500 academicians from different disciplines belong to the **International Society for Humor Studies**).

5



Here are some tips to help you put more laughter in your life:

- Figure out what makes you laugh and do it (or read it or watch it) more often.
- Surround yourself with funny people—be with them every chance you get.

- Develop your own sense of humor. Maybe even take a class to learn how to be a better comic—or at least a better joke-teller at that next party. Be funny every chance you get—as long as it’s not at someone else’s expense!

**Mark your answers to questions 6 through 10 in the section marked “Reading—Session 1” in your Student Response Booklet.**

6. According to the article, one way stress hormones can affect our health is by
  - A. raising blood pressure.
  - B. increasing T-cells and B-cells.
  - C. activating the immune system.
  - D. increasing oxygenation of the blood.
7. According to the article, which physical change can occur during laughter?
  - A. an increase in the number of blood platelets
  - B. an increase in salivary immunoglobulin A
  - C. a decrease in natural killer cells
  - D. a decrease in vascular blood flow
8. Psychological benefits of humor include
  - A. the potential to better handle difficult situations.
  - B. the ability to engage others in meaningful conversation.
  - C. the opportunity to self-diagnose physical ailments.
  - D. the potential to succeed at higher-level thinking.
9. Which statement **best** explains what the author means by the sentence “Laughter is cathartic” in paragraph 5?
  - A. Laughter can cleanse your body of negative emotions.
  - B. Laughter can make you better able to exercise vigorously.
  - C. Laughter can help a person meet new friends.
  - D. Laughter can be transferred from one person to the next.
10. Physicians and psychiatrists are becoming increasingly aware of the connection between the body and the mind. This is most likely due to
  - A. a growing friendship between the two types of doctors.
  - B. an increased number of comic movies and novels.
  - C. a growing body of humor and laughter scholarship.
  - D. a strong feeling that laughter is enjoyable.



*This is a passage about frogs in Florida. Read the passage and answer the questions that follow.*

**From Cross Creek**  
*Marjorie Kinnan Rawlings*

I do not profess to know all there is to know about frogs, lizards, ants, and varmints. I have learned enough, however, in years of enforced intimacy, to turn them from aliens into friends, or at least into bowing acquaintances. I should have been prepared to like frogs. One who has heard a northern spring come in on that silver chorus should make decent obeisance to the singers and all their related family. The frog Philharmonic of the Florida lakes and marshes is unendurable in its sweetness. I have lain through a long moonlit night, with the scent of orange blossoms palpable as spilled perfume on the air, and listened to the murmur of minor chords until, just as I have wept over the Brahms waltz in A flat on a master's violin, I thought my heart would break with the beauty of it. If there is not a finished tune, there are phrases, and there is assuredly a motif, articulated, reiterated. I searched long in my mental attic before I remembered where I had heard the sound before. It is the high thin jangle of Chinese music, overlaid with the pattern of glass windchimes, such as Alvah had given me for Christmas.

If frogs an inch long have never been carved in apple-green jade, they should be. Nothing else could repeat the jewel-like perfection of this diminutive species. Their eyes are tiny moonstones. I am sure of this, for I just stepped off the veranda and turned back a spider-lily leaf to look at one and make certain. They are also as soft and smooth as satin. I know this, too, for the variety is the one that clings to the wetness of the shower-bath pipe and drops on my skin.

They appear in June, full-fledged, and do not seem to change their size all summer. Martha calls them the rain-frogs. They are inch-long, animated pieces of pale green enamel. Self-conscious jewels, they seem to choose their setting. I find them until the first frost on the pleasanter side of a lily leaf. Spider lily leaves are preferred, being roomier, but a large Amaryllis will do. At night, or when the sun is not too fierce, they lie in the inner trough of the thick spiked leaves. When the sun is high, or when the rain comes down tempestuously, they cling with

tiny cream-jade vacuumed feet to the under side of a leaf. They roll their moonstone eyes. They quiver slightly if their perch is shaken. They move only when actually dispossessed, taking off in a long leap that is almost a flight.

They are a celestial breed of frogs and in season are found in apartments suitable to reincarnated Chinese emperors—large yellow allamanda blossoms. The flowers are trumpet-shaped, two inches deep. The chosen few among the frogs lie all day in these deep golden caves, contemptuous of a less luxurious world. I have no doubt that prevailing winds blow in their breakfasts and their teas of insects. There is an uncanny resemblance between the frogs and the buds of the allamanda. Until they open, the buds are precisely the size and shape of the frogs. Until well along into yellow prematurity, they are even the same shade of green. They have the same snub nose, the same little bulges of two eyes. It is easy to imagine that the more royal frogs are born in the allamanda blossoms, giving the buds their shape. It seems as though there must be a mystic affinity between the flower and its inhabitant. If I were a theosophist, I should certainly revere the tiny frogs as the living shape of Chinese aristocrats, who, even in an enforced humility of form, maintain an archaic arrogance. It would surely, I decided, be *lêse majesté* to scream at one in the shower bath.

The Widow Slater, however, always screamed at them.

"I'm as skeert of a toady-frog as of a snake," she said. "I don't want a thing to do with anything can swaller fire and shot."

Some connotation from Elizabethan witch days still clings in these Anglo-saxon parts to a frog or toad. "Eye of newt and toe of frog" in the litany of Macbeth's witches has its counterpart here. It is not the only trace of Old English in the Florida interior, for the backwoods people come of a line that stems back to Chaucer. The fire-swallowing of the Widow Slater's complaint I cannot vouch for, but I have it on reliable authority that a toad will swallow buckshot until he can hold no more.



Mark your answers to questions 11 through 21 in the section marked “Reading—Session 1” in your Student Response Booklet.

11. In the first paragraph, what does palpable mean?
- A. unpleasant
  - B. obvious
  - C. surprising
  - D. wasted
12. The imagery in the first paragraph of the passage is meant to suggest
- A. an orchestra.
  - B. an allamanda blossom.
  - C. a Chinese palace.
  - D. a painting.
13. The author knows that the frogs are soft and smooth because
- A. Widow Slater commented on how the frogs feel.
  - B. the author has read a lot of information about the frogs.
  - C. at least one frog has touched the author’s skin.
  - D. the frogs spend their days hiding and out of the sun.
14. In paragraph 4, what does affinity mean?
- A. assignment
  - B. oath
  - C. relationship
  - D. suggestion
15. In paragraphs 5 and 6, which statement about story elements is true?
- A. The theme of the passage is summarized.
  - B. The tone of the passage changes.
  - C. The emphasis shifts from opinion to description.
  - D. The author’s point of view is developed.
16. Which word would the author **most likely** use to describe the existence of the frogs?
- A. luxurious
  - B. tempestuous
  - C. uncertain
  - D. uneventful
17. The author’s opinions of frogs are **mostly** based on
- A. stories from friends.
  - B. childhood memories.
  - C. information from reference books.
  - D. personal experiences.
18. Which statement about the author is based on the information in the passage?
- A. She has spent a lot of time observing nature.
  - B. She prefers being alone to being around people.
  - C. She is a very talented musician.
  - D. She likes wearing expensive jewelry.





19. Which word **best** describes the author's tone in the passage?

- A. critical
- B. humorous
- C. personal
- D. objective

21. Which source would give the best information on what rain-frogs eat?

- A. almanac
- B. atlas
- C. encyclopedia
- D. dictionary

20. What is the **main** purpose of this passage?

- A. to describe the author's reaction to the frogs
- B. to discuss art, Chinese history, and Old English influence
- C. to make a contrast between the author and the Widow Slater
- D. to provide information about the relationship between frogs and plants

**Write your answer to question 22 in the space provided for it in your Student Response Booklet.**

22. Explain how the author uses imagery in this passage to create an effective picture of frogs and their habitat. Give two examples from the text to support your explanation.

**NO TEST MATERIAL  
ON THIS PAGE**

## Reading Session 2

**This test session includes reading selections, multiple-choice questions, and a question for which you must write out your answer. After you read each selection, answer the questions about it in the spaces provided in your Student Response Booklet. You may not use a dictionary or any other reference tool during this session.**

*Read this selection about a young man leaving home to go to college and his feelings toward his hard-working mother and then answer the questions that follow.*

### The Color of Water

*James McBride*

College was my way out. My eldest brother's wife, Becky, had gone to Oberlin College in Ohio and she told me I should apply because they had a great liberal arts school, a conservatory of music, and most of all, scholarship money. My high school grades were sour, my SATs low, but my musical and writing abilities were strong and I had good recommendations. To my utter amazement, the school accepted me. Mommy was completely happy when I told her the news. She hugged me and beamed, put the acceptance letter in her shoebox under her bed, and bragged to anyone she saw, in the supermarkets, at the library, "My son's going to Oberlin. You never heard of Oberlin? Oh, let me tell you . . ." I was the eighth straight child she sent to college. The seven before me all graduated and most went on for higher degrees.

2 On a cloudy, rainy day in September 1975, I packed everything I owned into an old green duffel bag and Ma drove me to the Greyhound bus station. As usual, she was broke, dumping single dollar bills, change, pennies on the counter to pay for the one-way ticket to Ohio. As I stepped on the bus she squeezed a bunch of bills and change into my hand. "It's all I have," she said. I counted it. Fourteen dollars. "Thanks, Ma." I kissed her and got on the bus quickly to hide my own tears. I felt I was abandoning her—she hated Delaware and I had talked her into staying there, and now I was leaving. Yet she wanted me to go. As I sat down on the bus and looked for her through the window, it occurred to me that since I was a little boy, she had always wanted me to go. She

was always sending me off on a bus someplace, to elementary school, to camp, to relatives in Kentucky, to college. She pushed me away from her just as she'd pushed my elder siblings away when we lived in New York, literally shoving them out the front door when they left for college. She would not hear of it when they applied to schools that were near home. "If you stay here, you'll fool around," she'd say. "Go away and learn to live on your own." Yet she'd wipe her eyes with the back of her hand and watch silently through the living room window as they smiled and waved goodbye from the sidewalk, straining under the weight of the same cheap duffel bag that now lay in the belly of the Greyhound bus, holding my things. She always cried when they left, though never in front of us. She'd retreat to her room for that. I was actually worried she would cry when I boarded the bus, but when I looked at her through the window I was relieved to see she wasn't crying at all. She was pacing, puckering her lips, frowning, making faces. She paced this way and that, hands in her pockets, as the wind blew swirls of leaves and discarded paper cups about her feet. She was wearing a brown raincoat and a scarf over her head, a lone white woman marching back and forth on a dim street in front of the dilapidated bus station in Wilmington, Delaware, beneath a rumbling Amtrak train trestle and a cloudy sky. She seemed so agitated and jumpy I remember wondering if she had to go to the bathroom. As the bus engine rumbled to life, she didn't wave but rather gave a quick flip of the hand that said, "Go! Go on!" and hurried away. The bus



pulled off and she was out of sight for a moment, but after we turned the corner I saw her from the window across the aisle and she had broken down. She was leaning on the wall beneath the train trestle,

head bowed, one hand squeezing her eyes, as if the tears that flowed out of them could be squeezed into oblivion.

**Mark your answers to questions 23 through 29 in the section marked "Reading—Session 2" in your Student Response Booklet.**

23. The **primary** purpose of the information in the first paragraph is to
- A. give background details.
  - B. develop the author's personality.
  - C. state the conflict.
  - D. introduce the author's fears about college.
24. The author suspected he would not be accepted by Oberlin, because
- A. his recommendations were mediocre.
  - B. his relatives had not gone to college.
  - C. he had not performed well academically.
  - D. he thought he could not afford it.
25. Which descriptions **best** state the mood of the author as he prepares to leave for college?
- A. excited and hurried
  - B. sad but hopeful
  - C. angry but understanding
  - D. eager and nervous
26. In paragraph 2, why does the mother hurry away?
- A. She wants to go home and take care of her other children.
  - B. She is afraid her son is going to miss his train.
  - C. She is tired of saying good-bye to her children.
  - D. She wants to avoid an emotional display in front of her son.
27. At the end of the selection, what technique does the author use to make the reader feel sympathy toward his mother?
- A. adding a melodramatic event
  - B. using powerful descriptions
  - C. restating his mother's main attributes
  - D. developing his mother's different personalities



28. What is the author's **primary** purpose in writing this selection?
- A. to entertain with humorous stories about his mother
  - B. to inform about unknown events in his life
  - C. to share secret information about himself
  - D. to illustrate his relationship with his mother

29. This selection is an example of
- A. drama.
  - B. nonfiction.
  - C. biography.
  - D. autobiography.



*Read questions 30 through 37 first and then look over the map and descriptions of hiking trails in Montana. Answer questions 30 through 37 by finding the answers in the descriptions and on the map.*

## **Montana Hikes**

### **Bear Creek Trail**

On Hwy. 93, drive approximately seven miles north of Hamilton, turn west onto Bear Creek Rd. Continue about two miles and turn right on Red Crow Rd. Travel less than a mile and turn left on Middle Bear Creek Road. Continue for three miles to the trailhead. This trail takes you to Bear Creek Falls and is approximately 4 miles round trip. The grade is moderate.

### **Blodgett Overlook Trail**

Turn west on Main St. in Hamilton off Hwy. 93 (at second stop light). Continue as Main St. becomes West Bridge Rd. (keep to the right). At the end of West Bridge Road turn left on Blodgett Camp Road and follow the signs to the Canyon Creek Trailhead. This trail provides spectacular views of Canyon Creek, Blodgett Canyon, and the valley below. It is approximately 1.5 miles to Blodgett Overlook, and is a moderate grade.

### **Boulder Creek Trail**

On Hwy. 93, four miles south of Darby, turn west onto the West Fork Road. Travel 15 miles and turn right into the Sam Billings campground. The trailhead is at the end of the campground. Boulder Creek Falls which is your destination is located within the Selway Bitterroot Wilderness. The hike there is about 4.5 miles on a moderate grade.

### **Lake Como North Trail and Rock Creek Trail**

On Hwy. 93, 12 miles south of Hamilton, turn right on Lake Como Road. Drive approximately 3 miles and turn right on FS Road 5623. Continue to the Upper Como campground where the trailhead begins. Stock use is restricted on the North trail. There is access across the dam making this hike a complete loop around the lake. This loop is also a suggested mountain bike trail. North trail ends at the bridge/falls. This is the point of access to the Rock Creek trail. The entire hike around the lake is approximately 7 miles. There are very few inclines making it a very easy trail.

### **Warm Springs Trail**

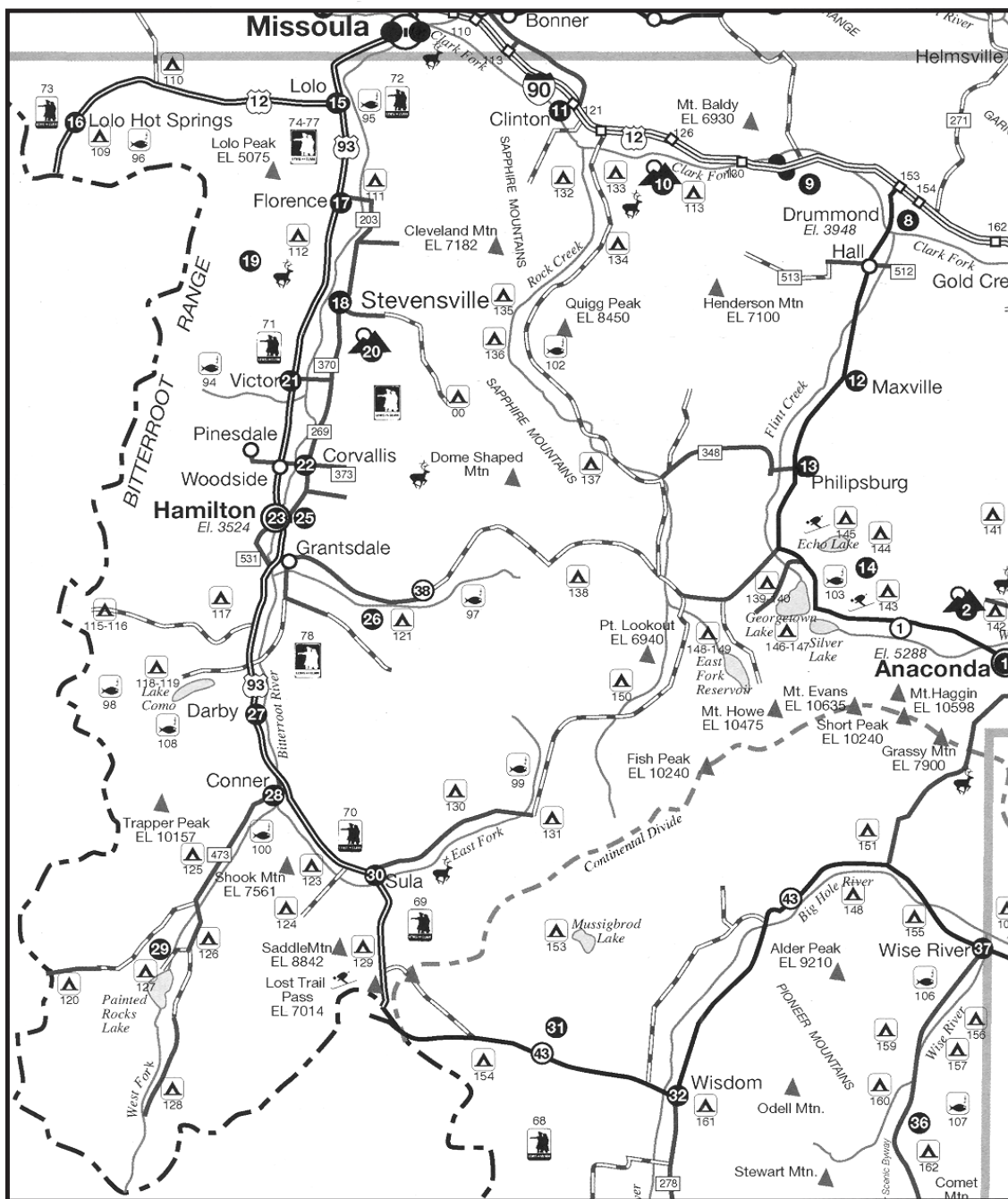
On Hwy. 93, approximately 4 miles north of Sula, turn west on Medicine Springs Road (FS #5728). Continue for approximately four miles to the Crazy Creek campground. Follow the signs to the trailhead. This nine mile trail is easy for the first 7 miles, but difficult on the final 2 miles.

### **Canyon Falls**

These are some of the more accessible falls in the Bitterroot Range. The stream tumbles in a series of cataracts in a drop of nearly 200 feet. To reach the trailhead, go west on Main Street through Hamilton and continue to Ricketts Road. Ricketts is about .1 miles past the left bend on Main. Go right (north) to Blodgett Camp Road. Go left (west) for just under 2 miles where Blodgett Camp Road takes a sharp right. Go right for about .5 miles to Canyon Creek Road. Follow this road to the trailhead on Canyon Creek.



# Hikes in Montana



0 Miles 11 20  
One inch = approximately 11 miles

## Legend

- Locator number (matches numeric listing in section)
- Wildlife viewing
- Campsite (number matches number in campsite chart.)
- State Park

- Fishing Site (number matches number in fishing chart.)
- Lewis and Clark point of interest (first crossing. Number refers to information in section.)
- Lewis and Clark point of interest (return trip. Number refers to information in section.)

- Rest stop
- Interstate
- U.S. Highway
- State Highway
- Country Road
- Gravel/unpaved road



Mark your answers to questions 30 through 37 in the section marked “Reading—Session 2” in your Student Response Booklet.

30. Which hike suggests the **most** scenic view with moderate climbs?
- A. Boulder Creek
  - B. Blodgett Overlook
  - C. Canyon Falls
  - D. Lake Como North
31. Which trailhead would be closest if you were in an area south of Hamilton but north of Darby?
- A. Blodgett Creek
  - B. Bear Creek Trail
  - C. Warm Springs Trail
  - D. Lake Como North Trail
32. Which is the highest peak west of Hwy. 93?
- A. Trapper Peak
  - B. Hamilton
  - C. Shook Mountain
  - D. Saddle Mountain
33. According to the map “Hikes in Montana,” which area would you visit to have the widest variety of outdoor activities within a twenty-mile radius?
- A. Anaconda
  - B. Wise River
  - C. Hamilton
  - D. Lolo Hot Springs
34. The purpose of maps such as “Hikes in Montana” is to
- A. warn hikers of dangerous conditions.
  - B. suggest the best places to see wildlife.
  - C. help hikers plan their trips effectively.
  - D. encourage hikers to stay on established trails.
35. Which hikes are the **most** similar in distance and grade?
- A. St. Mary’s Peak and Kootenai Creek
  - B. Warm Springs and Lake Como North and Rock Creek
  - C. Boulder Creek and Camas Creek
  - D. Boulder Creek and Bear Creek
36. Based on the description of Canyon Falls, most of the falls in the Bitterroot Range are
- A. not easily reachable.
  - B. easier to reach than many falls.
  - C. often flooded by streams.
  - D. very easy to get to on foot.
37. This item was not scored.





## Reading Session 3

This test session includes reading selections, multiple-choice questions, and a question for which you must write out your answer. After you read each selection, answer the questions about it in the spaces provided in your Student Response Booklet. You may not use a dictionary or any other reference tool during this session.

*This is a poem written by Linda Pastan. Read the poem and answer the questions that follow.*

### The Happiest Day

- It was early May, I think  
a moment of lilac and dogwood  
when so many promises are made  
it hardly matters if a few are broken.
- 5 My mother and father still hovered  
in the background, part of the scenery  
like the houses I had grown up in,  
and if they would be torn down later  
that was something I knew
- 10 but didn't believe. Our children were asleep  
or playing, the youngest as new  
as the new smell of the lilacs,  
and how could I have guessed  
their roots were shallow
- 15 and would be easily transplanted.  
I didn't even guess that I was happy.  
The small irritations that are like salt  
on melon were what I dwelt on,  
though in truth they simply
- 20 made the fruit taste sweeter.  
So we sat on the porch  
in the cool morning, sipping  
hot coffee. Behind the news of the day—  
strikes and small wars, a fire somewhere—
- 25 I could see the top of your dark head  
and thought not of public conflagrations  
but of how it would feel on my bare shoulder.  
If someone could stop the camera then . . .  
if someone could only stop the camera
- 30 and ask me: are you happy?  
perhaps I would have noticed  
how the morning shone in the reflected  
color of lilac. Yes, I might have said  
and offered a steaming cup of coffee.

—Linda Pastan



Mark your answers to questions 51 through 55 in the section marked “Reading—Session 3” in your Student Response Booklet.

51. The title of this poem is **ironic** because
- A. the narrator did not know she was happy.
  - B. there were so many happy days back then.
  - C. the day did not really happen as the narrator described it.
  - D. the events described in the poem happened so long ago.
52. Which statement **best** describes the theme of the poem?
- A. Our children are a reflection of our own hopes and dreams.
  - B. Our memories are a way that we can hold on to our past.
  - C. Photographs are like poetry because they can capture a moment in time.
  - D. We often do not realize how special a moment in time is until it has passed.
53. Lines 10 through 15 refer to the idea that children
- A. repeat the mistakes of their parents.
  - B. will grow up and leave home.
  - C. represent what is good in our lives.
  - D. should be allowed to enjoy their childhood.
54. In lines 17 and 18, “the small irritations that are like salt / on melon were what I dwelt on” refers to
- A. the feeling of being overwhelmed by life’s challenges.
  - B. a way of remembering the past in a positive light.
  - C. an ability to put minor difficulties in perspective.
  - D. a tendency to focus on insignificant problems.
55. What does the repetition of the phrase “if someone could stop the camera” in lines 28 and 29 suggest?
- A. a sense of regret that such a precious time was not fully appreciated
  - B. a sense of foreboding that reflects the knowledge of an approaching tragedy
  - C. an opportunity for the author to introduce a new topic
  - D. an opportunity for the author to establish the setting



*This is an article about how to keep bears away from your food when you camp. Read the article and answer the questions that follow.*

## How to Protect Your Food from Bears

Outdoor activities are becoming more and more popular. As human beings move into animal territory in greater numbers, the possibility of wildlife encounters increases. Whether you are an avid backpacker or a casual day hiker, it is your responsibility to keep bears away from your food. If bears become used to human food, they may quickly become “nuisance bears” that need to be relocated or, in the worst cases, destroyed.

There are things you can do to keep your food and other tempting tidbits away from bears when you are in the backcountry. None of these techniques is foolproof; however, if you are careful and conscientious you can greatly reduce the chances of losing your lunch (and dinner, and breakfast). So do your part to keep bears safe from your food!

**Be prepared.** Always carry 100–150 feet of parachute cord (sturdy rope) or a bear canister with you when you are backpacking. Green or dark-colored rope is best, as it is more difficult for bears to see than standard white rope. The food bag or bags should be dark-colored, too, and sturdy. When you arrive at your campsite you can use your rope to hang your bags of food from the branch of a tree. Be sure to use a branch that is at least 10 feet long and 15 feet off the ground. The branch should be at least 4 inches from the trunk and 1 inch in diameter at the rope spot—sturdy enough to hold your food, but too weak to hold an agile bear cub!

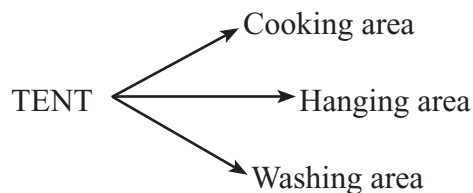
If a good tree is not available, or you do not have a good arm for throwing, a bear canister can be used to safely store your food. A bear canister is a hard, plastic can that bears can’t seem to get their paws around. There are many commercially available types

to choose from. Just be warned—they add extra weight to your pack (sometimes as much as 3–4 pounds).

**Maintain your site.** Never, ever leave food unattended at your campsite, even for a few minutes. A bear might not be able to sneak into your camp unnoticed while you hunt nearby for huckleberries, but small critters like chipmunks, mice, and squirrels can do their fair share of damage while you’re not looking!

**Think outside the (food) box.** Bears are attracted to unusual (and tasty) smells. How about that cherry-flavored lip balm you’re carrying? Toothpaste? The clothes you were wearing when you fried up that fresh-caught salmon? It all goes in a bear canister or in a bag, up a tree, and out of reach.

**Create the “bearmuda triangle.”** Bearproofing your site means more than just hanging or storing your food properly. It means setting up cooking, washing, and food hanging areas at least 200 feet from your tent, making sure the tent is upwind.



Protecting your food is a hassle, but not nearly as much of a hassle as being left foodless two days into a five-day hike. Remember this when you’re in the backcountry—and make sure to bring along a friend with a good arm for throwing!



Mark your answers to questions 56 through 60 in the section marked "Reading—Session 3" in your Student Response Booklet.

56. In the first paragraph, avid means
- A. secretive.
  - B. reluctant.
  - C. enthusiastic.
  - D. irresponsible.
57. The headings in **boldface** are intended to
- A. organize the information in chronological order.
  - B. highlight the techniques recommended.
  - C. separate fact from fiction.
  - D. restate material introduced in the first paragraph.
58. The **main** purpose of the diagram is to illustrate
- A. the correct way to set up a campsite.
  - B. a common mistake that many campers make.
  - C. the order of importance of each area.
  - D. the recommended distance between each area.
59. Which statement **best** describes the way in which this article is organized?
- A. The problem is stated, and specific strategies are given for prevention.
  - B. The steps to take when you set up a campsite are given in chronological order.
  - C. Some common errors made by hikers and campers are highlighted.
  - D. The author relates his own experiences in order to provide helpful hints to campers.
60. The tone of this article can **best** be described as
- A. humorous.
  - B. persuasive.
  - C. sarcastic.
  - D. informative.



*This is an article about what you can do to overcome anxiety. Read the article and answer the questions that follow.*

## Dealing with Anxiety

Steve Mandel

Anxiety is a natural state that exists any time we are placed under stress. Giving a presentation normally will cause some stress.

When you learn to make stress work for you, it can be the fuel for a more enthusiastic and dynamic presentation. These two pages will teach you how to recycle your stress in a positive form. The information will help you become a better presenter.

As someone once said, “the trick is to get those butterflies in your stomach to all fly in one direction!”

**Leo** is a student in high school. In two weeks he has to deliver a presentation to his class. He knows his topic, but his audience will be examining his presentation very closely, and Leo is certain he will receive some very tough questions. Every time Leo thinks about planning what to say, he gets too nervous to begin work.

If Leo’s problem of anxiety before a presentation sounds familiar, then the following may help:

### TIPS FOR REDUCING ANXIETY

#### 1. ORGANIZE

Lack of organization is one of the major causes of anxiety. Later in this book you will learn a simple technique for organizing your presentation. Knowing that your thoughts are well organized will give you more confidence, which will also allow you to focus energy into your presentation.

#### 2. VISUALIZE

Imagine walking into a room, being introduced, delivering your presentation with enthusiasm, fielding questions with confidence and leaving the room knowing you did a great job. Mentally rehearse this sequence with all the details of your particular situation, and it will help you focus on what you need to do to be successful.

#### 3. PRACTICE

Many speakers rehearse a presentation mentally or with just their lips. Instead, you should practice standing up, as if an audience were in front of you, and use your visual aids (if you have them.) At least two dress rehearsals are recommended. If possible, have somebody critique the first one and/or have it videotaped. Watch the playback, listen to the critique and incorporate any changes you feel are required before your final practice session. *There is no better preparation than this.*

**Carol** is a student in Leo’s high school class. She is making her presentation after Leo. Leo is finishing his remarks and in two minutes she will have to stand up and make her presentation. She is experiencing extreme anxiety at a time when she needs to be focused and collected.

Carol’s situation is quite common. If you experience anxiety immediately before speaking, try some of the following exercises next time you’re waiting for your turn to stand up and speak:



#### 4. BREATHE

When your muscles tighten and you feel nervous, you may not be breathing deeply enough. The first thing to do is to sit up, erect but relaxed, and inhale deeply a number of times.

#### 5. FOCUS ON RELAXING

Instead of thinking about the tension—focus on relaxing. As you breathe, tell yourself on the inhale “I am” and on the exhale, “relaxed.” Try to clear your mind of everything except the repetition of the “I am – relaxed” statement and continue this exercise for several minutes.

#### 6. RELEASE TENSION

As tension increases and your muscles tighten, nervous energy can get locked into the limbs. This unreleased energy may cause your hands and legs to shake. Before standing up to give a presentation, it is a good idea to try to release some of this pent up tension by doing a simple, unobtrusive isometric exercise.

Starting with your toes and calf muscles, tighten your muscles up through your body finally making a fist (i.e., toes, feet, calves, thighs, stomach, chest, shoulders, arms and fingers). Immediately release all of the tension and take a deep breath. Repeat this exercise until you feel the tension start to drain away. Remember, this exercise is to be done quietly so that no one knows you’re relaxing!

**Andrew**, another student in Leo’s class, gives his presentation tomorrow morning. When he gives presentations he gets very nervous. He sweats, his hands tremble, his voice becomes a monotone (and at times inaudible). He also fidgets with items, such as a pen, and looks at his notes or the overhead projector screen, not at his audience. He can barely wait to finish and return to his seat.

Andrew’s plight is not uncommon. You may not have all of these symptoms but you can probably relate to some of them. The following techniques will help you in situations where you get nervous while speaking.

#### 7. MOVE

Speakers who stand in one spot and never gesture experience tension. In order to relax you need to release tension by allowing your muscles to flex. If you find you are locking your arms in one position when you speak, then practice releasing them so that they do the same thing they would if you were in an animated one-on-one conversation. You can’t gesture too much if it is natural.

Upper body movement is important, but moving with your feet can serve to release tension as well. You should be able to take a few steps, either side-to-side or toward the audience. When speaking from a lectern you can move around the side of it for emphasis (if you have a moveable microphone). This movement will help release your tension and never fail to draw the audience into the presentation. If you can’t move to the side of the lectern, an occasional half-step to one side will help loosen muscle tension.

#### 8. EYE CONTACT WITH THE AUDIENCE

Try to make your presentation similar to a one-on-one conversation. Relate with your audience as individuals. Look in peoples’ eyes as you speak. Connect with them. Make it personal and personable. The eye contact should help you relax because you become less isolated from the audience and learn to react to their interest in you.



Mark your answers to questions 61 through 71 in the section marked “Reading—Session 3” in your Student Response Booklet.

61. According to the article, stress is
- A. always harmful.
  - B. potentially helpful.
  - C. unlikely to affect our performance.
  - D. impossible to predict.
62. Which of the following is **not** provided by the text that appears in boxes?
- A. examples of how anxiety affects people
  - B. situations that may be similar to those experienced by the reader
  - C. some techniques that may help to reduce anxiety
  - D. descriptions of students who experience anxiety
63. The purpose of the headings in **boldface** is to
- A. identify causes of stress.
  - B. establish a connection with the audience.
  - C. identify specific strategies.
  - D. name specific problems.
64. Under step 3, “Practice,” what does critique mean?
- A. write
  - B. rehearse
  - C. shorten
  - D. review
65. Which statement from the article is an opinion?
- A. “Anxiety is a natural state that exists any time we are placed under stress.”
  - B. “Later in this book you will learn a simple technique for organizing your presentation.”
  - C. “At least two dress rehearsals are recommended.”
  - D. “When speaking from a lectern you can move around the side of it for emphasis.”
66. Which sentence would be the **most** effective conclusion for this article?
- A. Using these tips should help to tame those butterflies of anxiety.
  - B. Now you are qualified to help people deal with anxiety.
  - C. The key to giving a successful presentation is to make it personal.
  - D. If you practice your presentation, you are bound to have a positive outcome.



67. The information in this article is organized **mainly** by

- A. levels of difficulty.
- B. order of preparation.
- C. levels of effectiveness.
- D. order of importance.

68. The author would **most likely** agree with which statement?

- A. Effective ways to deal with anxiety can be learned.
- B. The best way to deal with anxiety is to avoid stressful situations.
- C. The way people react to stress often cannot be predicted.
- D. Preparation has little to do with relieving anxiety.

69. Which statement **best** summarizes the information in the article?

- A. A few simple exercises can release tension caused by stress.
- B. Rehearsal is the best preparation for a presentation.
- C. Lack of organization will increase a presenter's level of anxiety.
- D. A person can take many steps to reduce anxiety.

70. Which information can the reader expect to find in another chapter of the book?

- A. tips on how to be a good audience
- B. techniques for focusing energy during a presentation
- C. an outline for evaluating a classmate's presentation
- D. steps to follow when writing a research paper

71. Which of the following would be the **best** source for additional information about this topic?

- A. an encyclopedia section about stress
- B. a Web site about the author
- C. an almanac entry of statistics on illnesses
- D. an article about public speaking





**Write your answer to question 72 in the space provided for it in your Student Response Booklet.**

72. Identify signs of anxiety both before and during a presentation. Describe what steps can be taken to reduce the effects of anxiety before and during a presentation. Use specific information from the article to support your answer.

**NO TEST MATERIAL  
ON THIS PAGE**

# Mathematics

## Session 1 (Calculator)

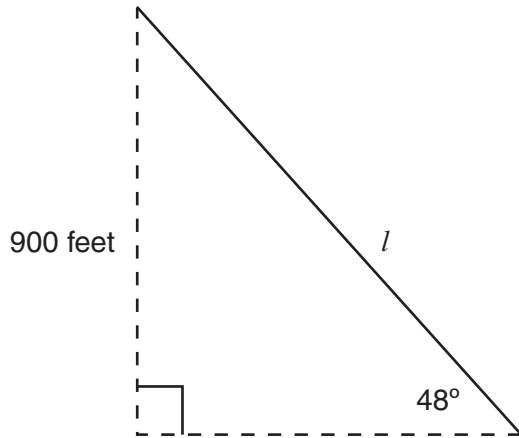
This test session includes multiple-choice questions and a question for which you must show your work or write out your answer. You may use a calculator during this session.

Mark your answers to questions 1 through 24 in the section marked “Mathematics—Session 1 (Calculator)” in your Student Response Booklet.

1. A scale model of the planet Saturn has a diameter of 3 inches. A model of Titan, one of Saturn’s moons, with the same scale would have a diameter of 0.12875 inches. Based on this information, if the actual diameter of Saturn is 120,000 kilometers, what is the diameter of Titan?
  - A. 23 kilometers
  - B. 5,150 kilometers
  - C. 15,450 kilometers
  - D. 310,680 kilometers
2. During a recent time trial, a bicycle racer traveled a distance of 32 miles in one hour. How many feet did he travel in one minute?
  - A. 168,960
  - B. 9,900
  - C. 2,816
  - D. 1,920
3. Emma has bowled 9 games this season. Her average score is 198. What is the least score she must bowl in her next game so that her average score for all 10 games will be 200?
  - A. 202
  - B. 208
  - C. 212
  - D. 218
4. The image of triangle  $ABC$  under a single transformation is triangle  $A'B'C'$ . Triangles  $ABC$  and  $A'B'C'$  are similar but are **not** congruent. What was the transformation?
  - A. translation
  - B. reflection
  - C. rotation
  - D. dilation



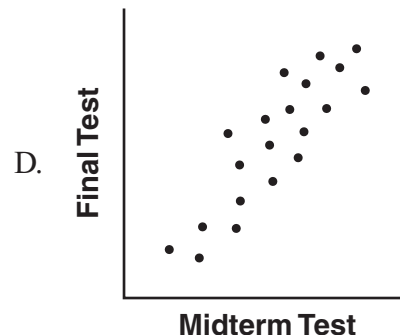
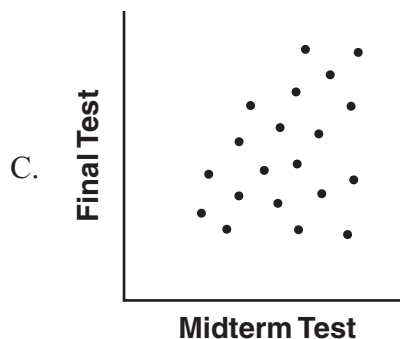
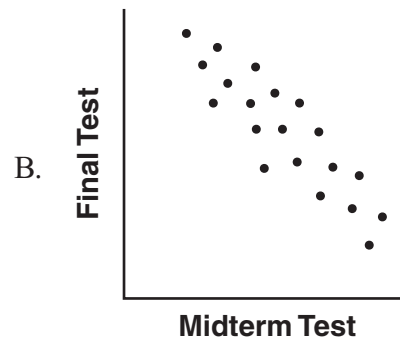
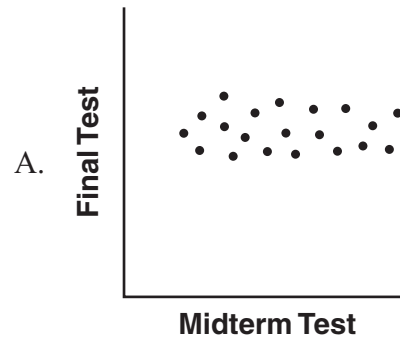
5. A mountain has a vertical drop of 900 feet. From the base of the mountain the angle of elevation is  $48^\circ$ , as shown in the figure below.



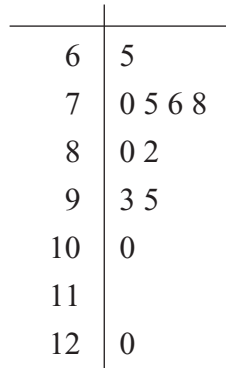
Which expression can be evaluated to find the length  $l$ ?

- A.  $\frac{900}{\sin 48^\circ}$   
 B.  $900 \sin 48^\circ$   
 C.  $\frac{900}{\cos 48^\circ}$   
 D.  $900 \cos 48^\circ$
6. What number is equivalent to  $\frac{5}{11}$ ?
- A. 0.454  
 B. 0.455  
 C.  $\overline{0.45}$   
 D.  $\overline{0.454}$

7. Mrs. Hawkins found a strong positive correlation between her students' scores on their midterm tests and their scores on their final tests. Which scatter plot is most likely the one based on her students' scores?



8. As part of a school assignment, Brittany collected data on the number of cars entering the national park entrance near her house. She displayed her data in the stem-and-leaf plot below.



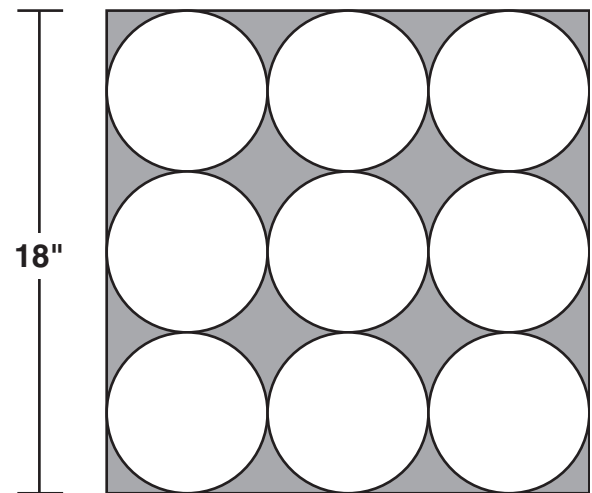
Which sketch of a box-and-whisker graph best represents Brittany's data?

- A.
- B.
- C.
- D.

9. A food manufacturer must decide which of two cylindrical cans to use for a new product. The larger can is the same height as the smaller can but has a radius that is 1.5 times the radius of the smaller can. How many times greater is the volume of the larger can than the volume of the smaller can?

- A. 1.5  
B. 2.25  
C. 3.0  
D. 3.375

10. The congruent circles in the square below are tangent to one another and to the square.



What is the approximate area of the shaded region in this figure?

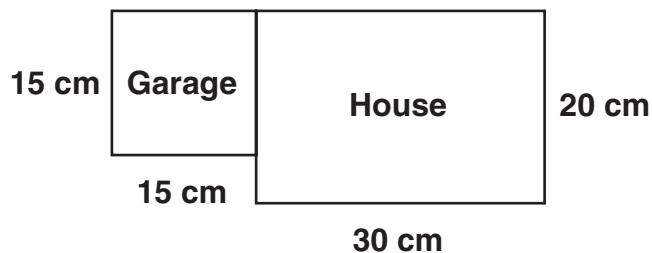
- A. 243 square inches  
B. 239 square inches  
C. 154 square inches  
D. 70 square inches



11. Jasmine paid \$6.30 for a plant during a recent sale at Green's Nursery, when the prices of all plants were reduced by 30%. What was the original price of the plant?

A. \$4.40  
B. \$8.19  
C. \$9.00  
D. \$9.89

12. The figure below shows the dimensions of a scale drawing of a house and attached garage.



If the drawing has a scale of 1:60, what is the total area of the outline of the actual house and garage?

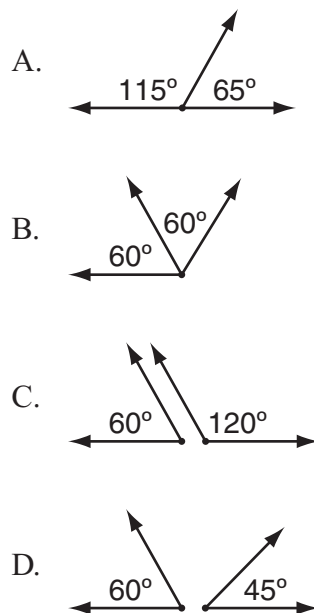
A. 49,500 cm<sup>2</sup>  
B. 123,900 cm<sup>2</sup>  
C. 135,000 cm<sup>2</sup>  
D. 2,970,000 cm<sup>2</sup>

13. For which value or values of  $n$  is the following statement true?

$$n^2 = \frac{1}{2}n$$

A.  $\frac{1}{2}$  only  
B.  $\frac{1}{2}$  and 0 only  
C. The statement is never true.  
D. The statement is true of all real numbers.

14. Steve claims that if two angles are supplementary, then they are adjacent. Which pair of angles is a counterexample to Steve's claim, proving that it is false?



15. The top pitchers in the Little League World Series throw the baseball 75 miles per hour. At that rate, how many seconds does it take for the ball to travel the 45-foot distance between the pitcher's mound and home plate?

- A. 0.41 second
- B. 0.60 second
- C. 0.64 second
- D. 1.67 seconds

16. A soup manufacturer pulled 600 soup cans at random off an assembly line. In 12 of the 16-ounce cans, there was less than 15.5 ounces of soup. Based on these data, of the 15,000 cans of soup manufactured daily, which of the following is the best estimate of the number of cans with less than 15.5 ounces of soup?

- A. 25
- B. 30
- C. 250
- D. 300

17. The chart below shows the number of students enrolled annually in Emerson College over a 9-year period.

Year	Number of Students
1	4620
2	4697
3	4900
4	5511
5	5638
6	5796
7	5986
8	6208
9	6463

Assuming that the trend shown in these data continues, which is the best prediction of the number of students enrolled in the tenth year?

- A. 6350
- B. 6600
- C. 6750
- D. 7000

18. State University has a ratio of 5 professors to every 87 students. If there are 11,310 students at State University, how many professors does State University have?

- A. 130
- B. 135
- C. 650
- D. 2262



19. The council members voted to invest \$1000 in community bonds. The value of the bonds grows exponentially, with an annual growth rate of 5%. Which table shows the relationship between the value of the bonds and the number of years since the bonds were issued?

A.

Year	Bond Value
0	\$1000.00
1	\$1050.00
2	\$1100.00
3	\$1150.00
4	\$1200.00

B.

Year	Bond Value
0	\$1000.00
1	\$1005.00
2	\$1010.03
3	\$1015.08
4	\$1020.15

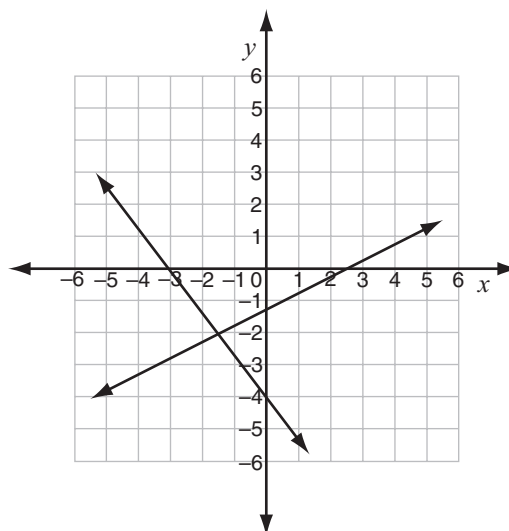
C.

Year	Bond Value
0	\$1000.00
1	\$1005.00
2	\$1010.00
3	\$1015.05
4	\$1020.00

D.

Year	Bond Value
0	\$1000.00
1	\$1050.00
2	\$1102.50
3	\$1157.63
4	\$1215.51

20. A system of two linear equations is graphed on the coordinate plane below.



Which is the best estimate of the  $x$ -value of the solution to this system of equations?

- A. 2.5  
B. -1.5  
C. -2  
D. -3



21. The relationship between the tensile strength,  $y$ , of gray iron and its hardness,  $x$ , is linear, with a positive slope and a  $y$ -intercept of zero. If the tensile strength of 24,000 pounds per square inch corresponds to a hardness of 160, which equation relates tensile strength,  $y$ , to hardness,  $x$ ?

- A.  $y = \frac{24,000}{160}x$   
B.  $y = \frac{160}{24,000}x$   
C.  $y = 160x$   
D.  $y = 24,000x$





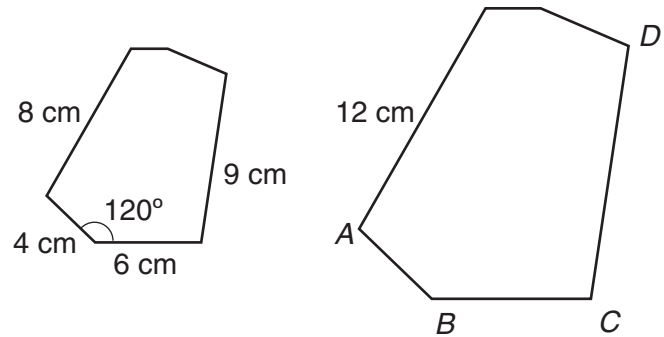
22. Mr. Finch brought to class a jar that contained a single tack. Each of four groups of students shook the jar 40 times and recorded whether the tack landed point down or point up. The results are shown in the table below.

Group		
Group 1	30	10
Group 2	34	6
Group 3	32	8
Group 4	34	6

Based on these data, if the jar is shaken 60 times, what is the **best** prediction of the number of times the tack will land point down?

- A. 9
- B. 11
- C. 12
- D. 15

Use the hexagons below to answer question 23.



23. If the hexagons are similar, which statement must be true?

- A.  $\frac{8}{12} = \frac{6}{BC}$
- B.  $\frac{8}{12} = \frac{BC}{6}$
- C.  $\frac{120}{\text{measure of } \angle B} = \frac{6}{BC}$
- D.  $\frac{120}{\text{measure of } \angle B} = \frac{BC}{6}$

24. Weight estimates on an airplane are based upon the total amount of cargo loaded onto the plane and the total number of passengers. The table below lists weight estimates for various amounts of cargo and numbers of passengers.

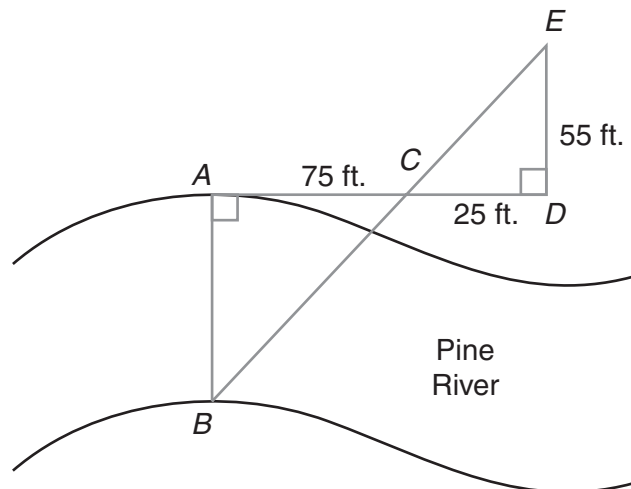
		Cargo Weight (In Pounds)			
Number of Passengers		2,000	4,000	6,000	8,000
	20	6,400	8,400	10,400	12,400
	40	10,800	12,800	14,800	16,800
	60	15,200	17,200	19,200	21,200
	80	19,600	21,600	23,600	25,600
	100	24,000	26,000	28,000	30,000

Based upon the patterns in this table, what is the estimated weight of 140 passengers and 14,000 pounds of cargo?

- A. 30,800 pounds
- B. 44,800 pounds
- C. 57,600 pounds
- D. 89,600 pounds

**Write your answer to question 25 in the space provided for it in your Student Response Booklet. Show all of your work.**

25. Rochelle is finding the distance between points  $A$  and  $B$  on opposite shores of Pine River. She used a transit to create the right triangles and then measured the distances that are shown on the diagram below.



- a. Prove that triangles  $ABC$  and  $DEC$  are similar.
- b. Find the distance across the river between points  $A$  and  $B$ . Justify your answer mathematically, showing all of your work.

# Mathematics

## Session 2A (Calculator)

This test session includes multiple-choice questions and a question for which you must show your work or write out your answer. You may use a calculator during this session.

Mark your answers to questions 26 through 35 in the section marked "Mathematics—Session 2A (Calculator)" in your Student Response Booklet.

Use the table below to answer question 26.

Term number ( $n$ )	Value ( $p$ )
1	3
2	5
3	7
4	9

26. Which rule describes the pattern shown in the table?

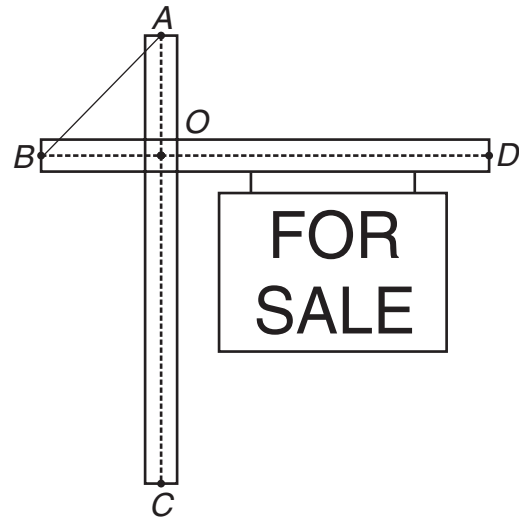
- A.  $p = n + 2$
- B.  $p = 2n + 1$
- C.  $p = 3n - 1$
- D.  $p = 5n - 2$

27. The formula for the volume of a cone is

$V = \frac{1}{3}\pi r^2 h$ . Which equation shows this formula solved for  $h$ ?

- A.  $h = \sqrt{\frac{1}{3}V\pi r}$
- B.  $h = \sqrt{\frac{3V}{\pi r}}$
- C.  $h = \frac{1}{3}V\pi r^2$
- D.  $h = \frac{3V}{\pi r^2}$

28. On the signpost below,  $\overline{AC} \perp \overline{BD}$ ,  $AO = OB$  and  $OD = OC$ .



If  $OC = 2.5 \times AO$ , and  $AB = 10$ , what is  $CD$ ?

- A. 4
- B. 10
- C. 12.5
- D. 25



29. Jeff is building a scale model of an airplane. The body of the actual plane is 32 feet 3 inches long, and the wingspan is 37 feet. He made the body of the model 15 inches long. How long should the wingspan of the model be?
- A. 13.1 inches  
B. 15.9 inches  
C. 17.2 inches  
D. 18.3 inches
30. There are  $b$  black socks and  $w$  white socks in a drawer. Which expression represents the probability of randomly picking a black sock from the drawer?
- A.  $\frac{b}{w+b}$   
B.  $\frac{1}{w+b}$   
C.  $\frac{w}{b}$   
D.  $\frac{b}{w}$
31. The 4 judges for a talent show sit along one side of a table facing the stage. In how many different ways can the judges be seated at the table?
- A. 10 ways  
B. 16 ways  
C. 24 ways  
D. 256 ways
32. Terry and Jessie rode their bikes for 45 minutes. In that time, Terry rode 3 miles more than Jessie. How much faster was Terry's average speed than Jessie's average speed?
- A. 3 miles per hour  
B. 4 miles per hour  
C. 9 miles per hour  
D. 15 miles per hour



# Mathematics

## Session 2B (No Calculator)

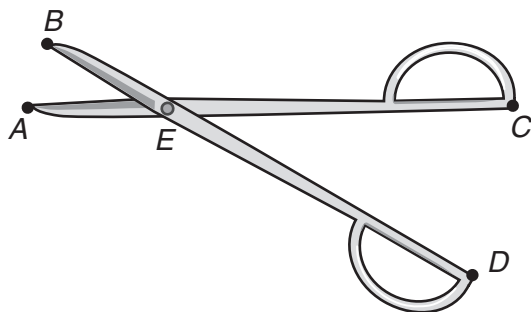
This test session includes multiple-choice questions and questions for which you must show your work or write out your answer. You may NOT use a calculator during this session.

Mark your answers to questions 37 through 46 in the section marked "Mathematics—Session 2B (No Calculator)" in your Student Response Booklet.

37. Which equation is equivalent to  $4x - 1 = 13$ ?

- A.  $4x = 14$
- B.  $4x = 12$
- C.  $x - 1 = 9$
- D.  $x - 1 = 17$

38. On the scissors shown below,  $AE = BE$  and  $CE = DE$ .



Which statement must be true?

- A.  $\triangle ABE \cong \triangle CDE$
- B.  $\triangle ABE \sim \triangle CDE$
- C.  $AB = 2CD$
- D.  $CD = 2AB$

39. John needed to order sand for a playground sandbox. The sandbox is 3 feet wide, 4 feet long, and 18 inches deep. To find how much sand to order, John performed the following steps.

- He multiplied 3 feet by 4 feet to get 12 square feet.
- He then multiplied 12 square feet by 1.5 feet to get 18 cubic feet.
- He divided 18 cubic feet by 3 feet in a yard to get 6 cubic yards of sand.

When the sand was delivered, he knew he had made a mistake. What should he have done differently?

- A. He should have divided by 27 instead of by 3 to get cubic yards.
- B. He should have multiplied by 18 instead of by 1.5 to find the volume.
- C. He should have multiplied by 3 rather than dividing by 3 to get cubic yards.
- D. He should have added  $3 + 4$  and multiplied by 2 instead of multiplying  $3 \times 4$ .



40. Which expression is equivalent to  $3x^2 \cdot 2x^3$ ?

- A.  $5x^5$
- B.  $5x^6$
- C.  $6x^5$
- D.  $6x^6$

41. A paper drinking cup is pictured below.



Which of the following could be a net for the cup?

- A.
- B.
- C.
- D.

42. Consider the formula  $R = \frac{p}{q}$  where both  $p$  and  $q$  are positive. Which change will always result in an **increase** in  $R$ ?

- A. a decrease in both  $p$  and  $q$
- B. an increase in both  $p$  and  $q$
- C. a decrease in  $p$  with an increase in  $q$
- D. an increase in  $p$  with a decrease in  $q$

43. Which expression is equivalent to  $(x - 7)^2$ ?

- A.  $x^2 + 49$
- B.  $x^2 - 49$
- C.  $x^2 - 14x + 49$
- D.  $x^2 - 14x - 49$

44. The sum of the first  $n$  counting numbers is given by the formula  $\frac{n(n+1)}{2}$ . What is the sum of the first 20 counting numbers?

- A. 190
- B. 210
- C. 380
- D. 420



# Mathematics

## Session 3 (No Calculator)

This test session includes multiple-choice questions and questions for which you must show your work or write out your answer. You may NOT use a calculator during this session.

Mark your answers to questions 49 through 69 in the section marked “Mathematics—Session 3 (No Calculator)” in your Student Response Booklet.

49. The average U.S. dollar bill has a thickness of  $4.3 \times 10^{-3}$  inch. What decimal is equivalent to  $4.3 \times 10^{-3}$ ?

A. 0.43  
B. 0.043  
C. 0.0043  
D. 0.00043

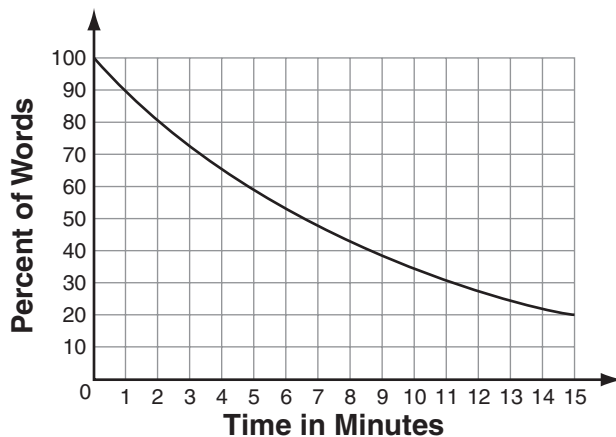
50. If an automobile is traveling at a speed of  $s$  miles per hour and the brakes are applied, the distance in feet,  $d$ , required for the automobile to stop is given by the expression below.

$$d = s + 0.06s^2$$

What is the stopping distance of an automobile that is traveling at 10 miles per hour?

A. 10 feet  
B. 16 feet  
C. 100.6 feet  
D. 1006 feet

51. For a research project, students were asked to memorize a list of words. After different lengths of time, the students were asked to recite the words on the list. The graph below models the average percent of words that students remembered after different lengths of time.

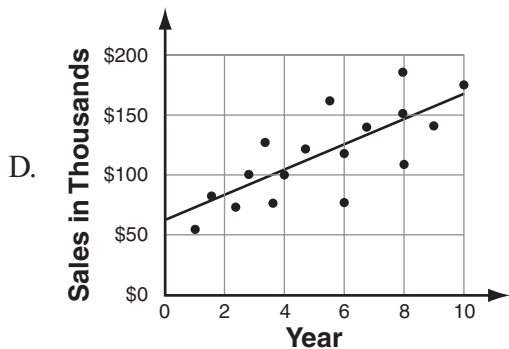
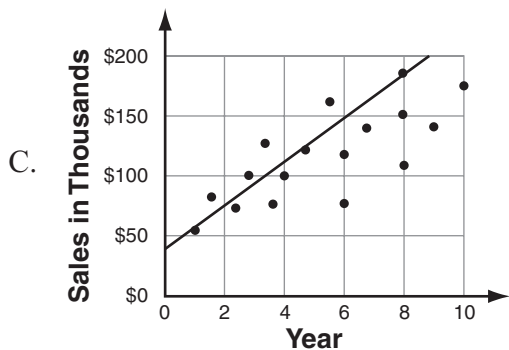
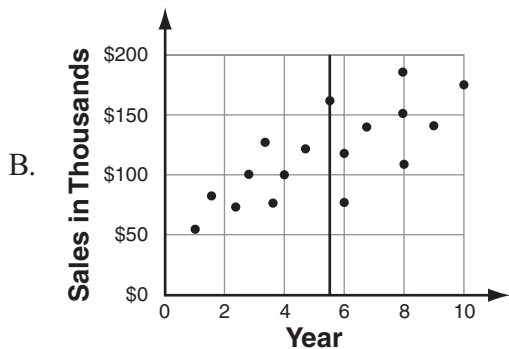
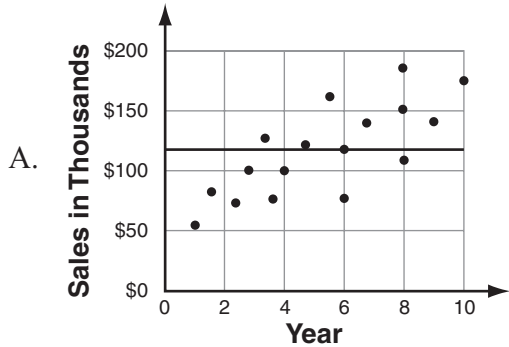


In which time interval did the percent of words that the students remembered decrease the most?

A. between minutes 0 and 2  
B. between minutes 3 and 5  
C. between minutes 9 and 11  
D. between minutes 13 and 15



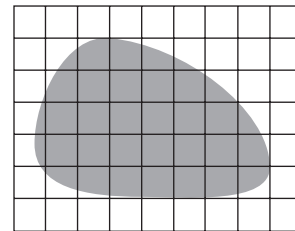
52. The four identical scatter plots below show the average monthly sales made by each of seventeen salespersons, together with his or her years of service to the company. In which scatter plot does the line drawn represent the line of best fit?



53. The length of each side of a cube is the cube root of its volume. If a cube has a volume of 64 cubic feet, what must be the length of each side of the cube?

- A. 4 feet
- B. 8 feet
- C. 21 feet
- D. 192 feet

54. To estimate the area of Echo Lake, scientists superimpose a grid on a map of the lake, as in the figure below. Each square of this grid represents an area of 1 acre.



What is the **best** estimate of the area of the surface of Echo Lake?

- A. 20 acres
- B. 26 acres
- C. 32 acres
- D. 43 acres

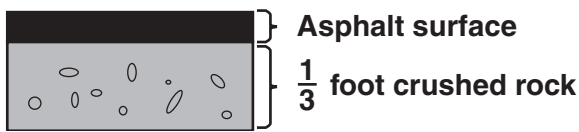




55. An Internet search engine identified 154,146 records in 0.21167 second. At that rate, what is the **best estimate** of the number of records that the search engine would identify in 1 second?

A. 30,000 records  
 B. 75,000 records  
 C. 300,000 records  
 D. 750,000 records

56. To serve as the base for an asphalt driveway, KM Construction Company uses crushed rock at a depth of  $\frac{1}{3}$  foot, as shown below.



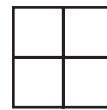
If the width in feet of a rectangular driveway is represented by  $w$  and its length in feet by  $l$ , which expression can be used to find the number of cubic feet of crushed rock required for the driveway?

A.  $\frac{1}{3}wl$   
 B.  $\frac{1}{3}(w + l)$   
 C.  $\frac{1}{3}w + l$   
 D.  $w + \frac{1}{3}l$

57. Which equation is **not** true for all non-negative real numbers  $a$ ,  $b$ , and  $c$ ?

A.  $a(b + c) = ca + ba$   
 B.  $-\frac{a}{b} + a(\frac{1}{b} + \frac{1}{c}) = \frac{1}{c}$   
 C.  $\frac{1}{a}(a + a) = 2$   
 D.  $(a + b)\frac{1}{a} = \frac{b}{a} + 1$

58. A structure is created using identical cubes. The top view and right side views are shown below.

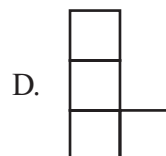
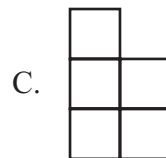
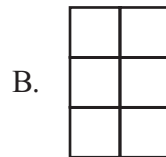


Top View



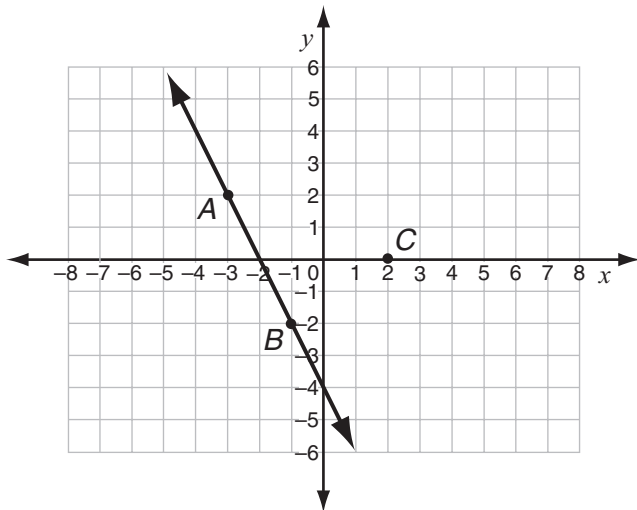
Right Side View

If the model contains exactly 6 cubes, which figure could represent the front view?



59. The school principal wants to survey the students to determine their feelings about changing the school colors. Which sampling design would give the most valid results?
- Survey the first 50 students who enter the school in the morning.
  - Have students attending the next pep rally write their names on slips of paper and then pull 50 of their names out of a hat.
  - Obtain a list of all registered students and randomly select 50 names from the list.
  - Leave 50 survey forms in the high school cafeteria with a sign asking for 50 volunteers to complete the forms.

Use the figure below to answer question 60.



60. If a line is drawn through point  $C$  that is parallel to  $\overline{AB}$ , which point will be on that line?
- (2, -2.1)
  - (3, -3.6)
  - (4, -4)
  - (5, -5)

61. A country music group did a survey of the ages of people attending its concerts. The results are shown below.

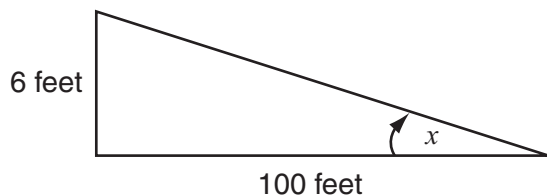
Age	Percent of Attendees
24 or less	12.8
25–34	18.4
35–44	20.9
45–54	24.2
55–64	9.1
65–74	8.5
75 +	6.1

Which type of graph would be most appropriate to display these results?

- circle graph
  - scatter plot
  - stem-and-leaf graph
  - box-and-whisker plot
62. Jonah has been using a fishing line with a diameter of 0.01 inch. He read about another line with a diameter that is  $\frac{3}{5}$  of the diameter of his line. What is the diameter of that line?
- 0.61 inch
  - 0.07 inch
  - 0.016 inch
  - 0.006 inch



63. A highway sign indicates that a stretch of road has a grade of 6 percent, which indicates that the road rises 6 feet for every 100 feet of run as shown in the diagram below.



Not drawn to scale

Which expression can be evaluated to find the degree measure of the angle  $x$ ?

- A.  $\tan^{-1} \frac{6}{100}$
- B.  $\tan^{-1} \frac{100}{6}$
- C.  $\sin^{-1} \frac{6}{100}$
- D.  $\sin^{-1} \frac{100}{6}$

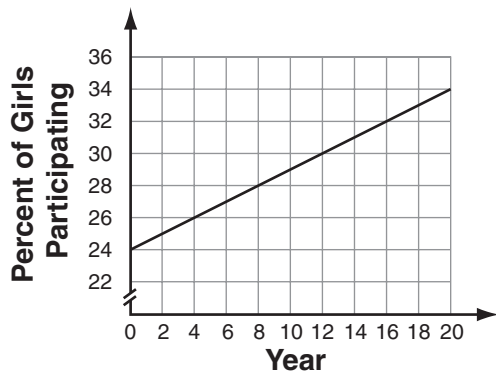
Use the statement below to answer question 64.

If the corresponding angles of two polygons are congruent, then the polygons are similar.

64. Which figures could be constructed to prove that this statement is **false**?
- A. two squares
  - B. two equilateral triangles
  - C. two rectangles that are not squares
  - D. two regular pentagons
65. Which type of polygon can never be equiangular?
- A. parallelogram
  - B. obtuse triangle
  - C. pentagon
  - D. equilateral octagon



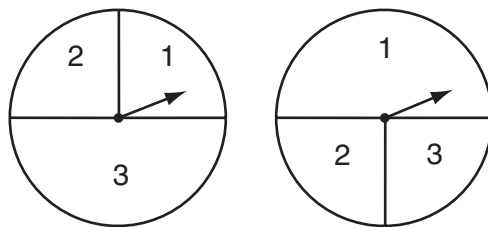
66. The graph below shows the approximate percent of girls participating in high school athletics over a period of 20 years.



Based on this graph, which equation shows the relationship between the year,  $y$ , and the percent,  $p$ , of girls participating in high school athletics?

- A.  $p = 24 + 2y$
- B.  $p = 24 + \frac{34}{20}y$
- C.  $p = 24 + y$
- D.  $p = 24 + \frac{1}{2}y$

67. Each of the spinners shown below is spun once and the sum of the numbers is recorded.



What is the probability that the sum is 4?

- A.  $\frac{1}{5}$
- B.  $\frac{1}{4}$
- C.  $\frac{1}{3}$
- D.  $\frac{3}{8}$



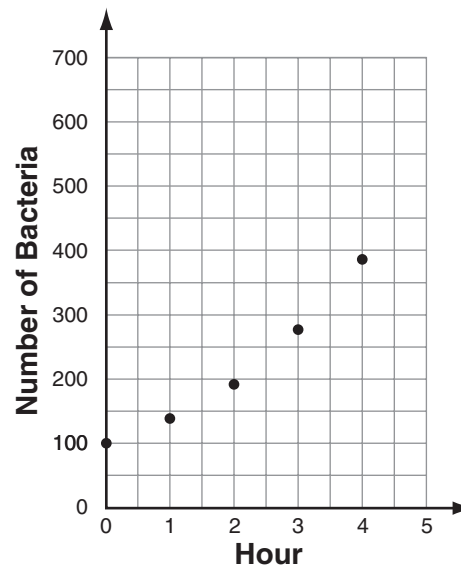
68. A factory purchased a stamping machine for \$30,000. The machine has decreased in value each year, as shown in the table below.

Machine Age (in years)	Machine Value
0	\$30,000
1	\$27,500
2	\$25,000
3	\$22,500
4	\$20,000

If the value of the machine continues to change at the same rate, which equation shows the relationship between the age,  $a$ , of the machine in years and the value,  $v$ , of the machine?

- A.  $v = -2,500a + 30,000$
- B.  $v = -2,500 + 30,000a$
- C.  $v = 2,500a + 30,000$
- D.  $v = 2,500 + 30,000a$

69. A biologist placed 100 bacteria in a laboratory culture dish. The graph below shows the number of bacteria in the dish after one, two, three, and four hours.



Based on these data, which is the best estimate of the number of bacteria in the dish after five hours?

- A. 425
- B. 475
- C. 550
- D. 675



**Write your answers to questions 70 through 72 in the spaces provided in your Student Response Booklet. Show all of your work.**

70. If the air temperature is  $-15^{\circ}\text{C}$ , the air temperature in degrees Fahrenheit is given by the expression below.

$$\frac{9}{5}(-15) + 32$$

What Fahrenheit temperature corresponds to a temperature of  $-15^{\circ}\text{C}$ ?

71. Solve for  $x$ .

$$2 - 3x = x + 10$$

72. What is the value of  $x^2 - 2(x - 4)$  when  $x = -1$  ?

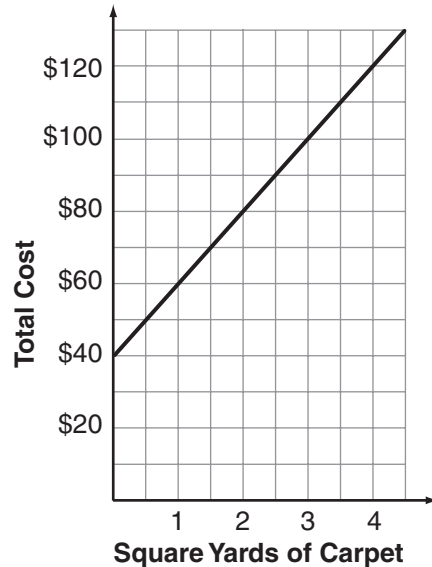


Write your answer to question 73 in the space provided for it in your Student Response Booklet. Show all of your work.

73. To install special carpet, the Home Store charges two fees:

- an initial preparation fee to prepare the floor for the carpet and
- a fee for each square yard of carpet that is installed.

The store's salespersons use the graph below to quickly determine the total cost of installing different numbers of square yards of this carpet.



- Write the equation for the line in the graph. Let  $y$  represent the total cost and  $x$  represent the number of square yards installed.
- Write the number that represents the  $y$ -intercept of the line on the graph.
- Write the number that represents the slope of the line.
- Suppose that the store decides to increase the cost per yard of the carpet but not to change the preparation fee. Explain how this change will affect **both** the  $y$ -intercept and the slope of the line.
- Suppose that the cost per yard is not changed but the preparation fee is increased. Explain how this change will affect **both** the  $y$ -intercept and the slope of the line.

BE SURE TO LABEL YOUR RESPONSES (a), (b), (c), (d), AND (e).





